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(54) Title: IMPROVED BACTERIAL OUTER MEMBRANE VESICLES

(57) Abstract: Existing methods of meningococcal OMV preparation involve the use of detergent during disruption of the bacterial membrane. According to the invention, membrane disruption is performed substantially in the absence of detergent. The resulting OMVs which retain important bacterial immunogenic components, particularly (i) the protective NspA surface protein, (ii) protein NMB2132 and (iii) protein NMB 1870.A Typical process involves the following steps: (a) treating bacterial cells in the substantial absence of detergent; (b) centrifuging the composition from step (a) to separate the outer membrane vesicles from treated cells and cell debris, and collecting the supernatant; (c) performing a high speed centrifugation of the supernatant from step (b) and collecting the outer membrane vesicles in a pellet; (d) re-dispersing the pellet from step (c) in a buffer; (e) performing a second high speed centrifugation in accordance with step (c), collecting the outer membrane vesicles in a pellet; (f) re-dispersing the pellet from step (e) in an aqueous medium.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal, MEDLINE, BIOSIS, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 02 062378 A (SMITHKLINE BEECHAM BIOLOG ; POOLMAN JAN (BE); DENOEL PHILIPPE (BE); 15 August 2002 (2002-08-15) *cf. abstract, page 2, 1st para., page 10, 2nd para., page 14, 2nd para. page 24, lines 15-25, page 26, lines 9-18, claims 1/2*	1-18
Y	WO 01 91788 A (NAESS LISBETH MEYER ; STATENS INST FOR FOLKEHELSE (NO); HARBAK KARI) 6 December 2001 (2001-12-06) *cf. abstract, page 6, 2nd and 3rd paras., page 7, lines 7-20, page 24, line 3 bridging with page 25, line 14, claim 1/2*	1-18



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Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	US 2002/110569 A1 (DAN M. GRANOFF, GREGORY R. MOE) 15 August 2002 (2002-08-15) *cf. abstract, page 6, feature '0068!, page 7, feature '0087! page 8, features '089!, '0091!*	1-18

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Patent document cited in search report		Publication date		Patent family member(s)	Publication date
WO 02062378	A	15-08-2002	WO	02062378 A2	15-08-2002
			EP	1357938 A2	05-11-2003
WO 0191788	A	06-12-2001	AU	6442701 A	11-12-2001
			CA	2410652 A1	06-12-2001
			EP	1286696 A1	05-03-2003
			WO	0191788 A1	06-12-2001
US 2002110569	A1	15-08-2002	AU	8088301 A	13-02-2002
			BR	0112928 A	26-08-2003
			CA	2416137 A1	07-02-2002
			EP	1322328 A2	02-07-2003
			WO	0209643 A2	07-02-2002